

ASOS MAINTENANCE NOTE 23 (for Electronics Technicians)

Engineering Division

W/OSO321:BGM/MGC

Dew Point Sensor Assembly Improvements

GENERAL

The Engineering Design Branch is developing improvements to the Automated Surface Observing System (ASOS) hygrothermometer dew point sensor. The efforts are continuing. A full scale evaluation of the final version of the new sensor will be performed to demonstrate its performance and provide data for a decision to implement. The major goals of the effort are to significantly reduce the corrosion problems and mirror icing problems.

A major subset the improvements serve is to reduce corrosion and improve functional performance without impacting sensor design. These changes can best be described as improvements in the current design and manufacturing processes and materials. The improvements are: the optical block is manufactured to tighter tolerances and made from gray PVC rather than Delrin; the optical block mount is made with a slot to permit precise positioning of the optics with respect to the mirror; phototransistors selected based on sensitivity; and the whole board is now conformal coated. These improvements have been applied to approximately 60 logistics replacement dew point sensors.

The agency stock number (ASN) for the interim sensor is S100-2MT4A1A1-2. This sensor will be stocked separately from existing sensors. When ordering the S100-2MT4A1A1-2 sensor NLSC may substitute a S100-2MT4A1A1-1 sensor. This is acceptable since the sensors are interchangeable.

PROCEDURE

Maintenance of the S100-2MT4A1A1-2 sensor is the same as the existing sensor S100-2MT4A1A1-1 except as follows:

Mirror Cleaning:

Clean the S100-2MT4A1A1-2 sensor using the current procedure, but omit the step that uses lacquer thinner (ASOS Site Technical Manual S100, Table 5.5.2, Step 10). **The lacquer thinner can dissolve the conformal coating that is now adjacent to the mirror and spread it onto the mirror. Subsequent cleaning with the alcohol will not remove the conformal coating contaminates from the mirror.** The contaminated mirror will have poor performance including icing. **Continue to use the lacquer thinner for the S100-2MT4A1A1-1 sensor.**

Optical Loop Adjustment:

For the S100-2MT4A1A1-2 sensor **only** insert the attached pages 5-47A through 5-47D in, Chapter 5 "Temperature and Dewpoint Sensor," Section V Maintenance of the ASOS Site Technical Manual S100.

The revised procedure adjusts the optical loop using the **SD LEVEL LED** and the **SI LEVEL LED** with a dry mirror. This procedure has been used in the past. It provides the following advantages:

1. It is more easily, quickly and reliably completed.
2. It provides a thinner dew layer that reduces the rate of mirror icing.
3. It provides more consistent autobalance operation.

We welcome your comments on its use and effectiveness.

Make a pen-and-ink change to amend the optical loop adjustment as follows:

ASOS Site Technical Manual S100, Table 5.5.3.

1. Change step 18 to read "Ensure that **CALIBRATOR** switch is set to **OPR** position".
2. Add pen-and-ink change for S100-2MT4A1A1-1 only at top of Table 5.5.3.

EFFECT ON OTHER INSTRUCTIONS

None.

REPORT MAINTENANCE ACTION

None.

Original Signed

Acting Chief, Engineering Division

W/OSO321:BGMcCormick:rhz:5/13/96:disk EHB-11-J:"maint23a.h11" spellchecked:addition on 5/15/95

Use this procedure for S100-2MT4A1A1-2
Table 5.5.3. Model H083 Temperature/Dewpoint Sensor optical
Loop Adjustment

Step	Procedure
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Tools required:
Small flat-tipped screwdriver
Large flat-tipped screwdriver

CAUTION

Internal components of aspirator are delicate and must be handled with care. Excessive mechanical shocks can cause permanent damage.

1. Clean aspirator using the procedure in table 5.5.2. Omit step 10 (Lacquer thinner). Do not reapply ac power.
2. Install sensor / fan assembly in aspirator housing and secure with a captive screw.
3. Using large flat-tipped screwdriver, open temperature/dewpoint sensor transmitter access door.
4. Reset autobalance variable resistor to zero.
5. Apply power to sensor by setting POWER switch to **ON** (up) position.

Use this procedure for S100-2MT4A1A1-2Table 5.5.3. Model H083 Temperature/Dewpoint Sensor Optical
Loop Adjustment - CONT

Step	Procedure
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NOTE

The adjustments made in this section must be performed with a completely **dry** mirror. Ensure that mirror is dry **by** heating it for a minimum of 1 minute initially, then keeping the mirror temperature above ambient (TA) using the HEAT position of the TEST switch. The measurements and adjustments described in steps 6 and 7 must not be made while heating the mirror. Therefore, it is necessary to monitor the mirror temperature (TD), via the seven-segment display, and heat as necessary to ensure that TD is greater than TA, making the measurements and adjustments between the heating cycles.

6. Turn SD GAIN variable resistor (R21) until SD LEVEL LED (CR5) just goes on (threshold level).
7. Adjust SI GAIN variable resistor (R22) until SI LEVEL LED (CR9) goes on, then back off SI GAIN until SI LEVFL LED just goes off.
8. Ensure that **CALIBRATOR** switch is set to **OPR** position.
9. Using large flat-tipped screwdriver, close and secure temperature/dewpoint sensor transmitter access door.
10. On sensor status page at OID, turn on report processing for temperature/dewpoint sensor.

Use this procedure for S100-2MT4A1A1-2
Table 5.5.4. Model 1088 Temperature/Dewpoint Sensor Optical
Loop Adjustment

Step	Procedure
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Tools required:
Small flat-tipped screwdriver
Large flat-tipped screwdriver

CAUTION

Internal components of aspirator are delicate and must be handled with care. Excessive mechanical shocks can cause permanent damage.

1. Clean aspirator using the procedure in table 5.5.2. Omit step 10 (lacquer thinner) Do not reapply ac power.
2. Install sensor/fan assembly in aspirator housing and secure with a captive screw.
3. Using large flat-tipped screwdriver, open temperature/ dewpoint sensor transmitter access door.
4. Reset autobalance variable resistor to zero.
5. Apply power to sensor by setting POWER switch to **ON** (up) position.

Use this procedure for S100-2MT4A1A1-2
 Table 5.5.4. Model 1088 Temperature/Dewpoint Sensor Optical
 Loop Adjustment - **CONT**

Step	Procedure
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NOTE

The adjustments made in this section must be performed with a completely dry mirror. Ensure that mirror is dry by heating it for a minimum of 1 minute initially, then keeping the mirror temperature above ambient (TA) using the HEAT position of the MODE switch. The measurements and adjustments described in steps 6 and 7 must not be made while heating the mirror. Therefore, it is necessary to monitor the mirror temperature (TD), via the seven-segment display, and heat as necessary to ensure that TD is greater than TA, making the measurements and adjustments between the heating cycles.

6. Turn SD GAIN variable resistor (R21) until SD LEVEL LED (CR5) just goes on (threshold level).
7. Adjust SI GAIN variable resistor (R22) until SI LEVEL LED (CR9) goes on, then back off SI GAIN until SI LEVEL LED just goes off.
8. Ensure that **MODE** switch is set to **OPR** position.
9. Using large flat-tipped screwdriver, close and secure temperature / dewpoint sensor transmitter access door.
10. On sensor status page at OLD, turn on report processing for temperature/dewpoint sensor.